Name: Date:

Exam: Function Reflections (Solution version 13)

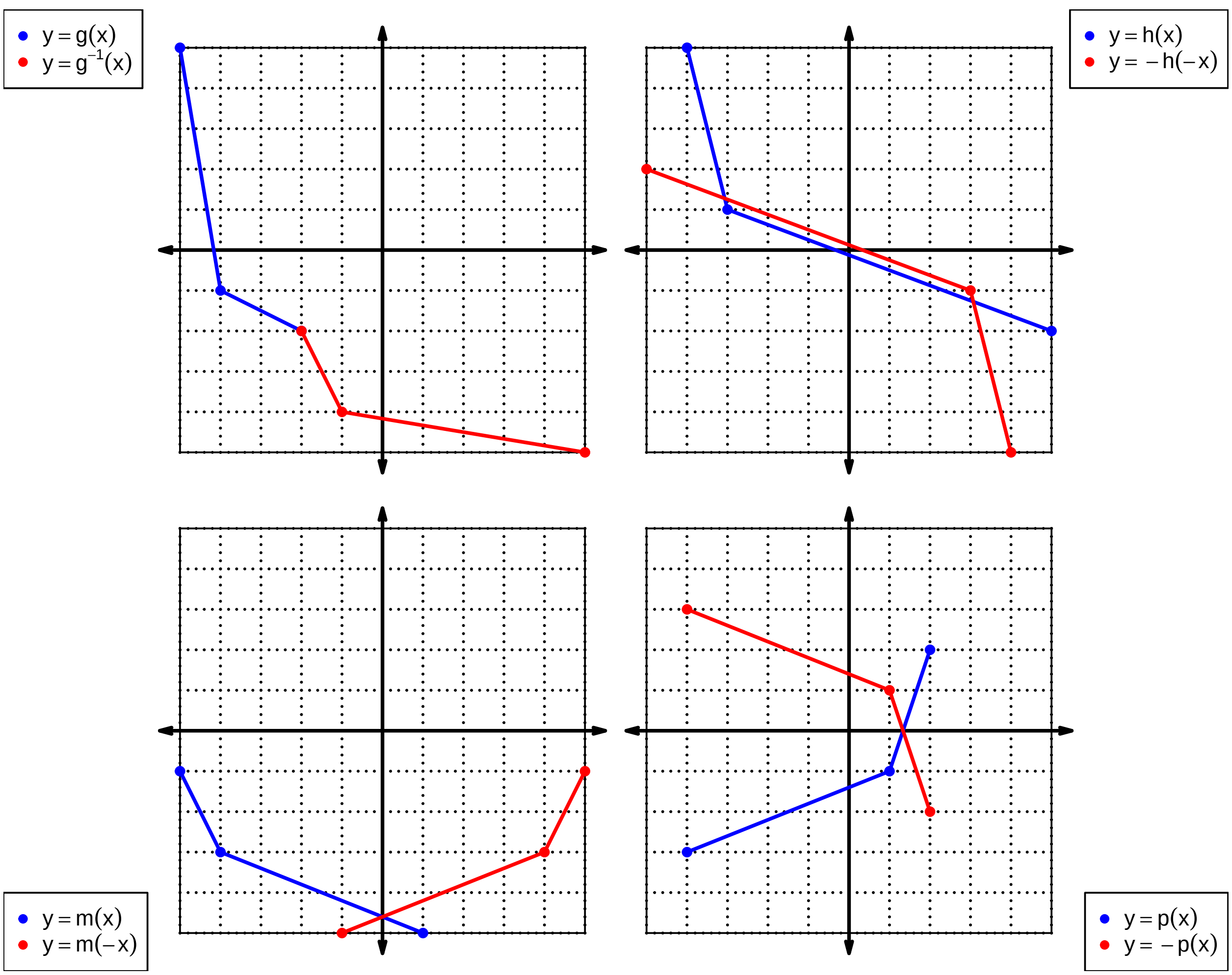
1. Let function f be defined by the polynomial below:

$$f(x) \;=\; 4x^5 + 6x^4 - 3x^3 + 8x^2 + 7x - 5$$

Draw lines that match each function reflection with its polynomial:

Reflections	Polynomials
$f(-x)$	$4x^5 - 6x^4 - 3x^3 - 8x^2 + 7x + 5$
$-f(x)$	$-4x^5 + 6x^4 + 3x^3 + 8x^2 - 7x - 5$
$-f(-x)$	$-4x^5 - 6x^4 + 3x^3 - 8x^2 - 7x + 5$

2. In each xy plane shown below, a function is graphed with blue. Draw the indicated reflections (as a second curve, indicated in legend) with black (or with whatever you have). The x axis is horizontal and the y axis is vertical (as typical), and the scale is equal on both axes.



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For all questions on this page, the functions f, g, and h are defined by the table below.

x	$f(x)$	$g(x)$	$h(x)$
1	4	7	8
2	3	8	9
3	9	1	2
4	7	2	7
5	1	6	3
6	2	5	1
7	5	9	6
8	6	3	4
9	8	4	5

3. Evaluate $g(5)$.

$$g(5) = 6$$

4. Evaluate $f^{-1}(9)$.

$$f^{-1}(9) = 3$$

5. By filling more rows of the table, it is possible to make function h **odd**. If that were done, what would be the value of $h(-1)$?

If function h is odd, then

$$h(-1) = -8$$

6. By filling more rows of the table, it is possible to make function g **even**. If that were done, what would be the value of $g(-4)$?

If function g is even, then

$$g(-4) = 2$$

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7. A function, f, is **even** if $f(x) = f(-x)$ for all x in the domain. A function, g, is **odd** if $g(x) = -g(-x)$ for all x in the domain.
   Let polynomial p be defined with the following equation:

$$p(x) \ = \ x^3 + x$$

   a. Express $p(-x)$ as a polynomial in standard form.

$$p(-x) \ = \ (-x)^3 + (-x)$$
$$p(-x) \ = \ -x^3 - x$$

   b. Express $-p(-x)$ as a polynomial in standard form.

$$-p(-x) \ = \ -\left(-x^3 - x\right)$$
$$-p(-x) \ = \ x^3 + x$$

   c. Is polynomial p even, odd, or neither?

   odd

   d. Explain how you know the answer to part c.

   We see that $p(x) = -p(-x)$ for all x because $p(x)$ and $-p(-x)$ are equivalent polynomials. Thus function p satisfies the criterion for being an odd function.

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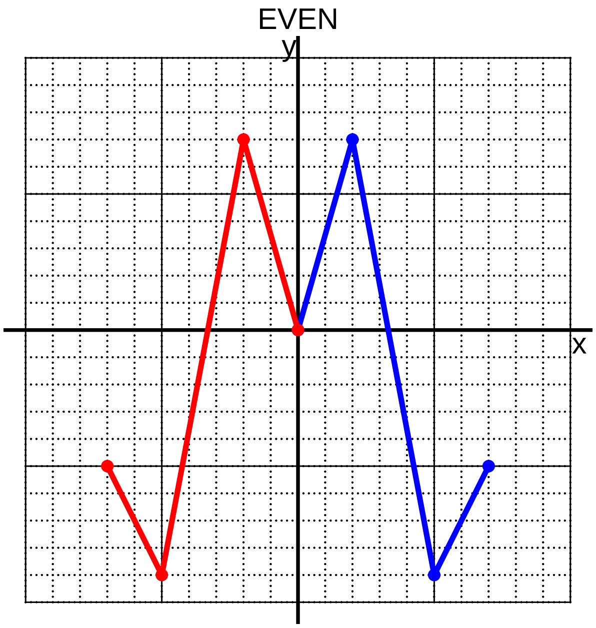
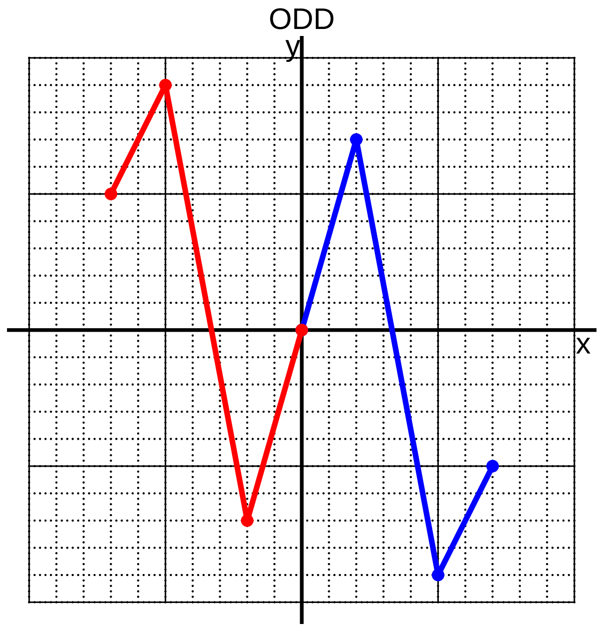
8. I have drawn half of a function. Draw the other half to make it even or odd.





9. Let function f be defined with the equation below.

$$f(x) = 2(x-8)$$

a. Evaluate $f(40)$.

step 1: subtract 8
step 2: multiply by 2

$$f(40) = 2((40)-8)$$
$$f(40) = 64$$

b. Evaluate $f^{-1}(76)$.

step 1: divide by 2
step 2: add 8

$$f^{-1}(x) = \frac{x}{2} + 8$$
$$f^{-1}(76) = \frac{(76)}{2} + 8$$
$$f^{-1}(76) = 46$$

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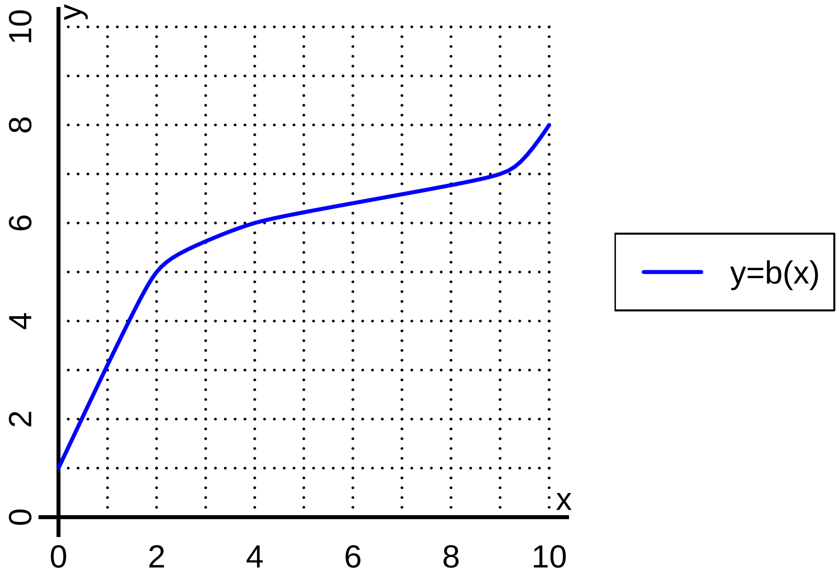
10. The function b is represented by the curve $y = b(x)$ graphed below.



a. Evaluate $b(2)$.

$$b(2) \;=\; 5$$

b. Evaluate $b^{-1}(6)$.

$$b^{-1}(6) \;=\; 4$$

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11. Function f is defined by the table below.

    a. Complete the columns for $-f(x)$ and $f(-x)$ and $-f(-x)$.

x	$f(x)$	$-f(x)$	$f(-x)$	$-f(-x)$
-2	-4	4	-4	4
-1	-6	6	6	-6
0	0	0	0	0
1	6	-6	-6	6
2	-4	4	-4	4

b. Is function f even, odd, or neither?

neither

c. How do you know the answer to part b?

Function f is neither because neither column $-f(-x)$ nor column $f(-x)$ matches column $f(x)$ exactly.